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Douglas W. Pocius

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PATENT LAW GROUP LLP
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SAN JOSE, CA 95134

EXAMINER

AMARI, ALESSANDRO V

ART UNIT

PAPER NUMBER

2872

DATE MAILED: 08/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/823,841

Applicant(s)

POCIUS ET AL.

Examiner

Alessandro V. Amari

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 May 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2-5, 7-13, 23, 24, 27-34, 41-47 and 50-52 is/are pending in the application.
- 4a) Of the above claim(s) 6, 14-22, 25, 26, 35-40, 48 and 49 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 45-47 and 50-52 is/are allowed.
- 6) ☒ Claim(s) 2-5, 7-13, 23, 24, 27-34 and 41-44 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 5/17/2004.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Paoli US Patent 5,317,170 in view of Duveneck et al US Patent 6,469,785 and further in view of Nurmikko et al US Patent 6,233,267.

In regard to claim 5, Paoli teaches (see Figure 1B, 4, 7, 8) a method of forming a light emitting device, said method comprising forming at least one of Fresnel lens (178) and holographic diffuser on at least one surface of a semiconductor light emitter (30) as described in column 2, lines 67-68 and column 3, lines 1-30 and column 12, lines 25-48.

However, Paoli does not teach that said forming comprises at least one method selected from ablation, machining, scribing and electron discharge machining.

In regard to claim 5, Duveneck does teach that said forming comprises at least one method selected from ablation, machining, scribing and electron discharge machining as described in column 7, lines 44-50.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to form the lens by the methods of Duveneck for the

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device of Paoli since scribing as taught by Duveneck is recognized in the art as a common and efficient means for producing the structures of a Fresnel lens.

Furthermore, neither Paoli or Duveneck teach that the surface is one of an alloy comprising $(\text{Al}_x\text{Ga}_{1-x})_y\text{In}_{1-y}\text{P}$ where $0 \leq x \leq 1$ and $0 \leq y \leq 1$ and a III-nitride alloy.

In regard to claim 5, Nurmikko et al does teach that the surface is one of an alloy comprising $(\text{Al}_x\text{Ga}_{1-x})_y\text{In}_{1-y}\text{P}$ where $0 \leq x \leq 1$ and $0 \leq y \leq 1$ and a III-nitride alloy as described in column 2, lines 1-67.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the material as taught by Nurmikko et al in the combination of Paoli in view of Duveneck et al in order to provide for a light emitter capable of operating at different wavelengths.

3. Claims 2, 3, 7, 8, 9, 10, 11, 12, 23, 24, 27, 28, 29, 30, 34, 41 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Paoli US Patent 5,317,170 in view of Duveneck et al US Patent 6,469,785 and further in view of Nurmikko et al US Patent 6,233,267.

In regard to claims 3, 12, 27, 34, 41 and 42, Paoli teaches (see Figure 1B, 4, 7, 8) a method of forming a light emitting device, said method comprising forming at least one of Fresnel lens (178) and holographic diffuser (86 in Figure 4) on at least one surface of a semiconductor light emitter (30) as described in column 2, lines 67-68 and column 3, lines 1-30 and column 12, lines 25-48.

Regarding claim 2, Paoli discloses (see Figure 7) that said semiconductor light emitter has at least one light extraction surface (182) from where light is

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intended to be extracted, and wherein said forming is done on at least one extraction surface of said semiconductor light emitter as described in column 12, lines 25-38.

Regarding claim 7, Paoli discloses that said method further comprises confining light emission to a preselected section of said light emitting layer as described in column 5, lines 60-68.

Regarding claim 8, Paoli discloses that said confining comprises at least one method selected from applying the Holonyak process, using selective area growth, using selective area bonding, using diffusion and using ion implantation as described in column 5, lines 17-24.

Regarding claims 9 and 28, Paoli discloses coating one or more surfaces of said semiconductor light emitter with a reflective material as described in column 9, lines 23-26.

Regarding claim 10, Paoli discloses coating said holographic diffuser with a reflective material as described in column 10, lines 43-49.

Regarding claim 11, Paoli discloses forming an optical element on the surface opposite of said extraction surface as described in column 12, lines 25-48.

Regarding claims 23 and 24, Paoli discloses that the first optical element is designed to achieve one of light focusing, light collimating and light diverging as described in column 12, lines 39-48.

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Regarding claim 30, Paoli teaches that said semiconductor layer comprises a transparent aluminum-bearing compound as described in column 4, lines 21-35.

However, in regard to claims 3, 12, 27, 29, 34, 41 and 42, Paoli does not teach that the Fresnel lens is formed by stamping.

In regard to claims 3, 12, 27, 29, 34, 41 and 42, Duveneck discloses a common method for manufacturing a Fresnel lens using a stamping block as described in column 7, lines 44-50 and column 14, lines 5-11.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to form the lens by the methods of Duveneck for the device of Paoli since stamp forming as taught by Duveneck is recognized in the art as a common and efficient means for producing the structures of a Fresnel lens.

However, in regard to claims 3, 12, 27, 34, 41 and 42, neither Paoli or Duveneck teach that that the surface is one of an alloy comprising $(\text{Al}_x\text{Ga}_{1-x})_y\text{In}_{1-y}\text{P}$ where $0 \leq x \leq 1$ and $0 \leq y \leq 1$ and a III-nitride alloy.

In regard to claims 3, 12, 27, 34, 41 and 42, Nurmikko et al does teach that the surface is one of an alloy comprising $(\text{Al}_x\text{Ga}_{1-x})_y\text{In}_{1-y}\text{P}$ where $0 \leq x \leq 1$ and $0 \leq y \leq 1$ and a III-nitride alloy as described in column 2, lines 1-67.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the material as taught by Nurmikko et al in the combination of Paoli in view of Duveneck et al in order to provide for a light emitter capable of operating at different wavelengths.

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4. Claims 3, 10, 12, 13, 23, 24, 27, 34, 41 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yanagase et al US Patent 5,528,057 in view of Nurmikko et al US Patent 6,233,267.

In regard to claims 3, 12, 27, 34, 41 and 42, Yanagase et al teaches (see Figures 1-4) a method of forming a light emitting device, said method comprising forming at least one of Fresnel lens (8) and holographic diffuser on at least one surface of a semiconductor light emitter (14) wherein said forming comprises pressing a stamping block against at least one surface of said semiconductor light emitter as described in column 4, lines 26-34. Regarding claim 10, Yanagase teaches coating said Fresnel lens with a reflective material as described in column 4, lines 36-38. Regarding claim 13, Yanagase et al further teaches a reflective material coating at least one surface of the device as described in column 4, lines 36-38. Regarding claims 23 and 24, Yanagase et al teaches that said first optical element is designed to achieve one of light focusing, collimating and diverging or to direct light in a preselected direction as described in column 3, lines 63-67 and column 4, lines 1-10 and as shown in Figure 2.

However, in regard to claims 3, 12, 27, 34, 41 and 42, Yanagase et al does not teach that the surface is one of an alloy comprising $(\text{Al}_x\text{Ga}_{1-x})_y\text{In}_{1-y}\text{P}$ where $0 \leq x \leq 1$ and $0 \leq y \leq 1$ and a III-nitride alloy.

In regard to claims 3, 12, 27, 34, 41 and 42, Nurmikko et al does teach that the surface is one of an alloy comprising $(\text{Al}_x\text{Ga}_{1-x})_y\text{In}_{1-y}\text{P}$ where $0 \leq x \leq 1$ and $0 \leq y \leq 1$ and a III-nitride alloy as described in column 2, lines 1-67.

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It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the material as taught by Nurmikko et al in the device of Yanagase et al in order to provide for a light emitter capable of operating at different wavelengths.

5. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Paoli U.S. Patent 5,317,170 in view of Duveneck et al US Patent 6,469,785, further in view of Nurmikko et al US Patent 6,233,267 and further in view of Kish et al U.S. Patent 5,376,580.

Regarding claim 4, Paoli in view of Duveneck et al and further in view of Nurmikko et al teaches the invention as set forth above but does not teach that said forming is executed concurrently with a wafer-bonding process, said wafer bonding process comprising removing a first substrate of said semiconductor light emitter and bonding a second substrate to said semiconductor light emitter.

Regarding claim 4, Kish et al does teach said forming is executed concurrently with a wafer-bonding process, said wafer bonding process comprising removing a first substrate of said semiconductor light emitter and bonding a second substrate to said semiconductor light emitter as described in column 3, lines 28-48, column 6, lines 36-68 and column 7, lines 23.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the wafer bonding process as taught by Kish et al in the light emitting device of Paoli in view of Duveneck and further in view of Nurmikko et al in order to increase mechanical and/or thermal stability of the light emitting device.

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6. Claims 31-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Paoli U.S. Patent 5,317,170 in view of Duveneck et al US Patent 6,469,785 and further in view of Nurmikko et al US Patent 6,233,267 and further in view of Fogarty U.S. Patent 5,141,677.

Regarding claims 31-33, Paoli in view of Duveneck and further in view of Nurmikko et al teaches the invention as set forth above but does not teach that said stamping is executed at an elevated temperature, said elevated temperature being higher than room temperature or lowering said elevated temperature to facilitate the separation of a stamping block from said semiconductor light emitter after said stamping or that said elevated temperature is higher than the ductile transition temperature of the material constituting said at least one surface on which the optical element is formed.

Regarding claims 31-33, Fogarty teaches that said stamping is executed at an elevated temperature, said elevated temperature being higher than room temperature as described in column 9, lines 19-25 or lowering said elevated temperature to facilitate the separation of a stamping block from the light emitter after said stamping as described in column 9, lines 41-45 or that said elevated temperature is higher than the ductile transition temperature of the material constituting said at least one surface on which the optical element is formed as described in column 8, lines 17-24.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the stamping temperatures and processes as taught by Fogarty in the light emitting device of Paoli and Duveneck and

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Nurmikko et al in order to increase the ease of separation between the block and the optical element due to thermal expansion and contraction properties of the block material.

7. Claims 43 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Paoli U.S. Patent 5,317,170 in view of Duveneck et al US Patent 6,469,785 in view of Nurmikko et al US Patent 6,233,267 and in further view of Tomomura et al. U.S. Patent 4,988,579.

In regard to claims 43 and 44, Paoli teaches (see Figure 1A, 7, 8) a display device comprising a light emitting device which comprises: a semiconductor light emitter (30); and one of a optical element (178) formed on a surface of said semiconductor light emitter as described in column 2, lines 67-68 and column 3, lines 1-30 and column 12, lines 25-48.

However, Paoli does not teach an optical element stamped on a surface of said semiconductor light emitter.

In regard to claims 43 and 44, Duveneck et al does teach that said forming said optical element comprises stamping against at least one surface of the semiconductor light emitter as described in column 7, lines 44-50 and column 14, lines 5-11.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to form the lens by the methods of Duveneck for the device of Paoli since stamp forming as taught by Duveneck is recognized in the art as a common and efficient means for producing the structures of a Fresnel lens.

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However, the combination of Paoli in view of Duveneck et al does not further teach that the stamped surface is one of an alloy comprising $(\text{Al}_x\text{Ga}_{1-x})_y\text{In}_{1-y}\text{P}$ where $0 \leq x \leq 1$ and $0 \leq y \leq 1$ and a III-nitride alloy.

In regard to claims 43 and 44, Nurmikko et al does teach that the stamped surface is one of an alloy comprising $(\text{Al}_x\text{Ga}_{1-x})_y\text{In}_{1-y}\text{P}$ where $0 \leq x \leq 1$ and $0 \leq y \leq 1$ and a III-nitride alloy as described in column 2, lines 1-67.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the material as taught by Nurmikko et al in the combination of Paoli in view of Duveneck et al in order to provide for a light emitter capable of operating at different wavelengths.

Furthermore, Paoli in view of Duveneck et al and further in view of Nurmikko et al does not teach a display device comprising at least one blue light emitting device, at least one green light emitting device, and at least one red light emitting device.

In regard to claims 43 and 44, Tomomura et al. does teach (see Figures 11 and 12) a display device comprising at least one blue light emitting device, at least one green light emitting device, and at least one red light emitting device, wherein at least one of said blue light emitting device, green light emitting device, and red light emitting device as described in column 7, lines 36-68 and column 8, lines 1-3.

It would have been obvious to one having ordinary skill in the art at the time the invention was made utilize the red, green and blue light emitting devices as taught by Tomomura et al. in the combination of Paoli in view of Duveneck et

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al and further in view of Nurmikko et al in order to produce light with high efficiency and brightness over a large spectral range.

8. Claims 53 and 54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Paoli US Patent 5,317,170 in view of Duveneck et al US Patent 6,469,785 and further in view of Nurmikko et al US Patent 6,233,267 and further in view of Calveley US Patent 6,165,911.

In regard to claims 53 and 54, Paoli in view of Duveneck et al and further in view of Nurmikko et al teach the invention as set forth above but does not teach that the stamping block comprises a material selected from the group of molybdenum, titanium, zirconium, graphite, silicon carbide, sapphire, stainless steel, tungsten, tantalum, columbium and alloys thereof.

In regard to claims 53 and 54, Calveley does teach that the stamping block comprises a material selected from the group of molybdenum, titanium, zirconium, graphite, silicon carbide, sapphire, stainless steel, tungsten, tantalum, columbium and alloys thereof as described in column 7, lines 39-45.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to stamp the lens of Paoli in view of Duveneck and further in view of Nurmikko et al using a stamping block with the material as taught by Calveley since stamping blocks made of this material exhibit very high durability thus increasing the precision of the formed structures over the operational life of the stamping block.

Allowable Subject Matter

9. Claims 45-47 and 50-52 are allowed.

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10. Claims 45 and 52 are allowable over the prior art for at least the reason that the prior art fails to teach or reasonably suggest, "the bond being formed at an interface between the material and a surface of the semiconductor light emitter from which light exits the emitter" as set forth in the claimed combination. Claims 46, 47, 50 and 51 are also allowable based upon their dependence on claim 45.

The prior art of record, Duveneck et al and Spaeth teach a light emitting device wherein the optical element is stamped on a material transparent to light and being one of the materials claimed wherein the material is bonded to the semiconductor light emitter. However, the prior art does not teach that the bond being formed at an interface between the material and a surface of the semiconductor light emitter from which light exits the emitter and there is no motivation or teaching to modify this difference as derived.

Response to Arguments

11. Applicant's arguments with respect to claims 2-5,7-13,23,24,27-34 and 41-44 have been considered but are moot in view of the new ground(s) of rejection.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alessandro V. Amari whose telephone number is (571) 272-2306. The examiner can normally be reached on Monday-Friday 8:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on (571) 272-2312. The fax

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phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ava *ava*
10 August 2004


MARK A. ROBINSON
PRIMARY EXAMINER